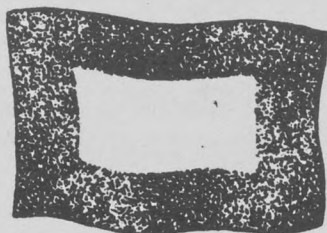
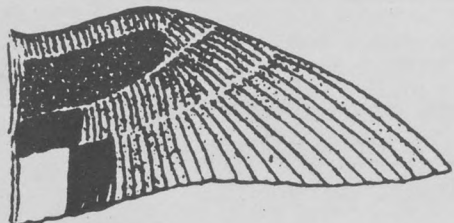
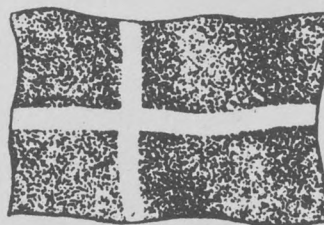
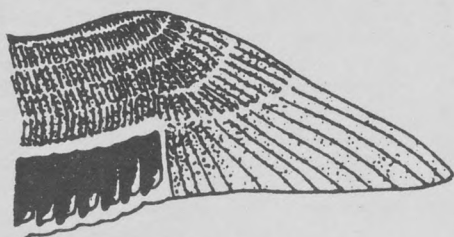




ZOOLOG

PUBLISHED QUARTERLY BY THE ZOOLOGICAL SOCIETY OF MANITOBA



SEPTEMBER 1967

Single Copy 25c

Volume 8, No. 3

Free to members of the Zoological Society of Manitoba

**The editor of
Zoolog will gladly
accept applications
for membership
to the Zoological
Society of Manitoba.**

**Regular Membership
\$5.00**

**Contributing Membership
\$25.00**

**Write to the address below
or phone 738-4767 Petersfield
or 247-3853 Winnipeg.**

ERRATUM

I am embarrassed. In the last issue of *Zoolog* I made a mistake. Under the heading: Twins make history, I boldly said that all of the eleven captive born gorilla babies have been raised by people. This is wrong. Only the first born babies and a few others have not been accepted by their mothers. As it is very hard to find out everything about all gorillas ever born in captivity, it is quite possible that even this correction is wrong. However, *Zoolog's* policy is to be correct, and should I be advised of any inaccuracy, you shall be told. In the meantime, will you accept my apologies?

On the Cover

This comparison of Ducks' wings with national flags appears in Prof. Tinbergen's. The Study of Instinct. The accompanying text blames K. Lorenz for the idea of comparing the patterns and colors of the wings, identifying the bird, with flags of identification used by humans. The Ducks are from top to bottom: Mallard Drake, European Widgeon, Shoveller Drake and Gadwall Drake. The corresponding flags might be of Yugoslavia (red white and blue, although there is no red in the Mallard's wing), France (blue, white, red), Denmark (red with white cross), and the standard P, the "blue Peter" in sailors' language, flown by ships in harbors ready to sail within twelve hours (white with blue band).

ZOOLOG

**Zoolog is published quarterly by the
Zoological Society of Manitoba.
Editor — Dieter H. Schwanke**

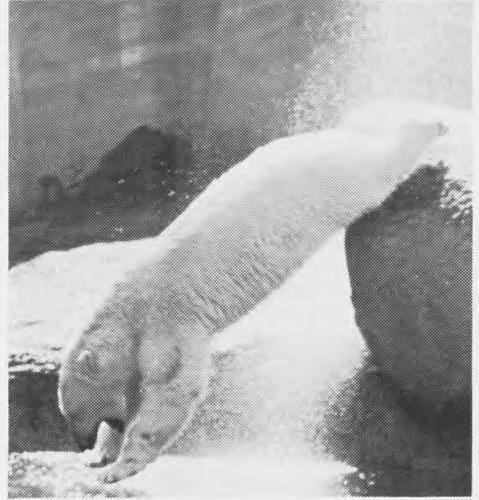
Address Letters to the Editor to Clandeboye, Man.

Authorized as second class mail by the Post Office Department, Ottawa,
and for payment of postage in cash.

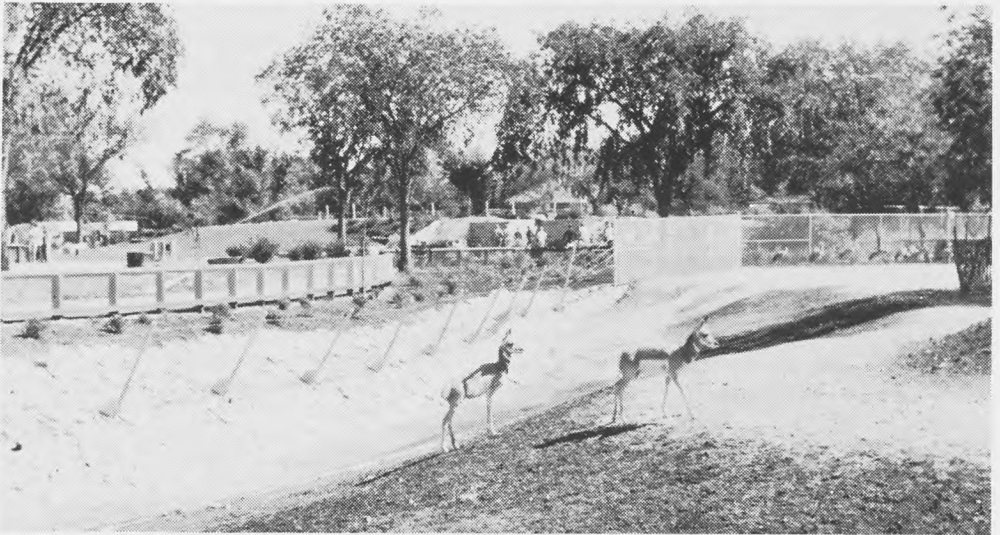
For the readers who have not visited Assiniboine Park Zoo lately, here are a few scenes of the new look of enclosures. From the Polar Bears' joyful dive into the water we may take it for granted that he, at least, is quite happy with his newly remodelled quarters. We must point out here, however, that the bear accommodations are not completed and eventually the ugly concrete of the side and back walls will also take on the sculptured look.

The part of Assiniboine Park Zoo formerly known as "the lane" was the scene of frantic activity for the past year and our picture of the Pronghorn Antelope enclosure shows part of the result of the tremendous landscape reformation that took place in this area. Instead of ugly fences, huge posts and muddy fields, hills and dales have been created and trees and bushes planted that will allow visitors to view the animals there without any restrictions in the front, and no diversions of shelters and feeding racks in back. Naturally, some of the plants are in need of some growth, but surely, one must make some concessions to nature.

Re-creation at the Zoo



Both Photos — Wolf-Heck, August 1967



Raising Cranes

No less than three Demoiselle Cranes, *Anthropoides virgo*, are being raised at our Assiniboine Park Zoo this year. This is more than ever in one season before.

Cranes, in those cases Sandhill Cranes, are also raised at the Alberta Game Farm and the Calgary Zoo, however from eggs collected in the wild.

Our success story appears to be the only example anywhere in Canada of Crane raising from captive birds.

Encouraged by this fine result, I am assembling a somewhat larger Crane collection than our Zoo had before. Female Sarus Cranes are expected to arrive shortly, and a type of Crane "rarer in Canada than even the Whooping Crane" is being acquired. This one is the Mongolian Hooded Crane, *Grus monacha*.

—Gunter Voss, Dr. rer. nat.

President's Report

A condensed version of the President's report to the annual meeting of the Zoological Society of Manitoba.

The most notable accomplishments of the past season appear to be the complete rejuvenation of the Bear accommodation and the new Hoof Stock paddocks and handling pens in the east central portion of the Zoo.

Your Society has been engaged in a number of activities over the course of the last year. I would like to mention a few of the highlights.

Through the generosity of Mrs. Peter Curry, who is also a Director of the Society, we received the gift late last fall of a splendid pair of Hartmann Mountain Zebra. Mrs. Curry specifically mentioned when making this gift that she hoped it would provide leadership to others who might be considering gifts of animals or animal accommodation to the Zoo through the Society. This kind of leadership is sincerely appreciated but quite aside from this aspect of the gift, the citizens of this community will enjoy observing these fine animals for many years to come. They are among the finest animals on exhibit in our Zoo.

I am sure all members of the Society have noted the new look which our quarterly publication has achieved in the last several issues. Under the guidance of our new editor, Mr. Dieter Schwanke, Zoolog is well on the way to becoming a first-class publication containing not only information on the Zoo but the wildlife of Manitoba in general.

Over the course of the winter, a small committee of the Society has been concerning itself with a new issue of the Zoo Guide Book. We had hoped at one time that a new issue could be made available for 1967, but it became increasingly apparent as we studied the problem, that it would be far better for us to delay publication until 1968 when a much better library of photographs would be available. We have already authorized a sum of money for the taking of photographs this summer, and we hope that a new Guide Book, partially in color, will be available next spring.

Once again, the Zoo has had an offer of a young elephant from India. Naturally, we have had to turn this down because of the lack of suitable accommodation but we are attempting to keep the channels of communication with the Indian Government open for the future.

We are indebted to Mr. Al Wiley, of Wiley-Mercury Sales Ltd., for his sponsorship of the Cougar exhibit at Polo Park last fall and a subsequent donation of a pair of Cougars to the Zoo.

We have recently approached Metro with a request that the rejuvenated Bear accommodations be identified as a memorial to the late Tom Hodgson who, until his death, was Superintendent of the Winnipeg Parks Board. It was under Tom's knowing hand that the Bear accommodation was completed in the early 50's and since this was the first major project in the Zoo for a good many years, we think it most appropriate that his name appear on this exhibit.

We continue to be concerned with the apparent isolation of the Zoological Society and more particularly the Society's Committee for Research & Liaison from the day-to-day activities and the long-range planning at the Zoo. This Committee, you will recall, has given continuing advice for a good many years now to Metro and previously to the City of Winnipeg, on masterplan development of our Zoo. Unfortunately, it has happened in recent years that the Society is consulted after budgets have been established. We have recently requested that our Research & Liaison Committee be permitted to participate with Metro at the time the capital budgets are drawn up.

We have noted with some interest two recent developments in our community. The first, an announcement that plans are under way for the keeping of animals at Bird's Hill Park now being developed by the Provincial Government. The second item of interest is the announcement of a re-development plan for downtown Winnipeg to include a recreation mall reminiscent of the Tivoli Gardens in Copenhagen. Just to give everybody something to think about as these plans go ahead, I would like to recommend that serious consideration be given to the establishment of an Aquarium and a Reptile Exhibit in downtown Winnipeg. Quite obviously, such facilities would not be open air but rather would require a rather substantial building to protect the exhibit from the rigors of our climate. When one considers the great amount of traffic pressure which now exists on Assiniboine Park, it might indeed be very good sense to spread out our community investment in animal exhibits to other locations, namely the Downtown Redevelopment and the Bird's Hill Park.

—George Heffelfinger

Tale of a Great Zoo

D. H. Schwanke, August 1967



Mr. R. Marlin Perkins with a young female walrus, captured in August in Canada's Arctic, on his stopover at the Winnipeg airport.

Manitoba's White Whale, the Beluga

Of all the mammals native to Manitoba, probably no one has a greater appeal to spectators than the Beluga, *Delphinapterus leucas*. The Beluga, also descriptively called White Whale, is commonly found around Fort Churchill. On the very day when St. Louis Zoo Director Marlin Perkins left Winnipeg for St. Louis, after he had collected a female Walrus in the Hudson Bay area, a party of three senior staff members of the New York Aquarium travelled through Winnipeg, Churchill-bound. Their target: three live Belugas for the aquarium in New York. An airplane was standing by to haul this valuable live cargo, once obtained, from Manitoba to New York.

Our own Zoo at Assiniboine Park will consider the inclusion of a Beluga exhibit in the northern aquatic or in the ocean-dweller range. It is expected that planning of the northern aquatic range may earnestly begin in 1968, while the ocean-dweller portion is likely to follow much later.

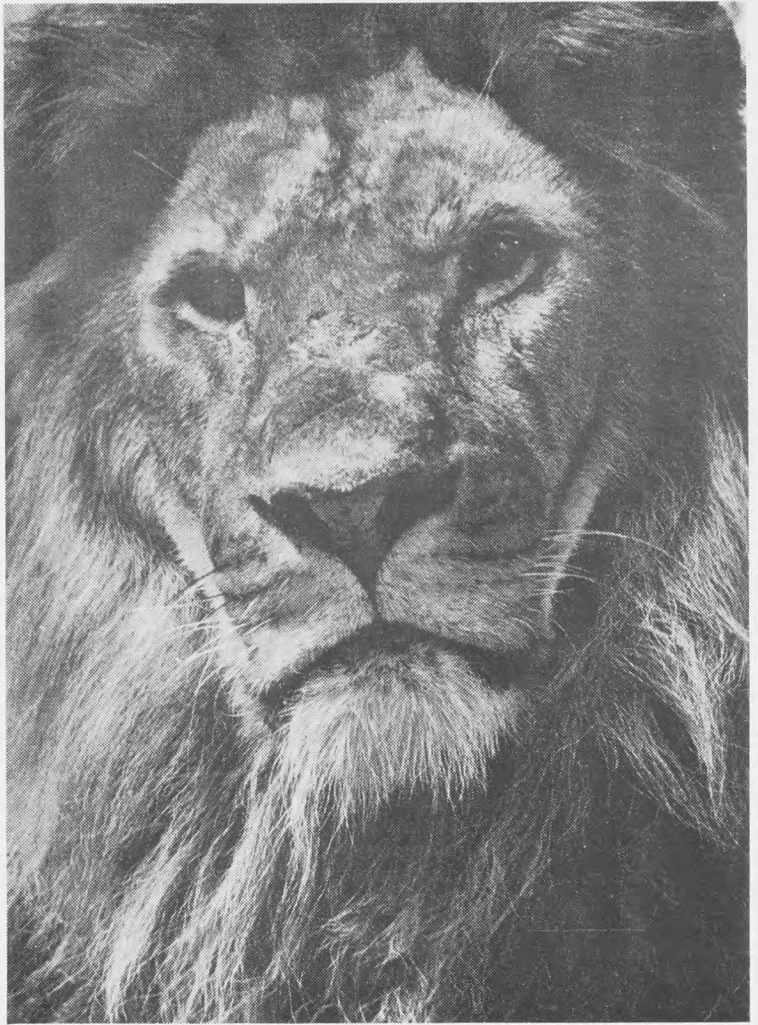
Mr. R. Marlin Perkins is the Director of the St. Louis Zoological Park at Forest Park in St. Louis, Missouri. He started his career, literally litter-picking at the Zoo in which he is now the Director. In between, he has searched for the abominable snowman in the Himalayas, has been Director of Lincoln Park Zoo in Chicago and has collected Walrus in Canada's Arctic. When Rolf W. Henning and Dr. Gunter Voss approached Winnipeg in 1959, by way of Zoo-visiting stops in New York, Chicago and Milwaukee, Mr. Perkins was a most generous host one evening in Chicago.

The St. Louis Zoological Park has an estimated attendance of nearly three million people a year. Its annual budget amounts to about \$1,100,000.00, composed of \$700,000.00 from city taxes and \$400,000.00 from refreshment, guide-book and postcard sales and the like. Another \$40,000.00 are received from the Zoological Society every year, not taking into account donations and bequests. There is no admission charge.

The Zoo is run under the control of a "Zoological Board," which consists of devoted, Zoo-minded citizens including certain city executives. Thereby the interests of Zoological Society members, "City Fathers" and unorganized Friends of the Zoo are equally represented. A businessman of outstanding reputation presides over this "Zoological Board." The Zoo Director serves as Secretary.

There is a fine animal collection in over 800 different species (for comparison, 130 species in Winnipeg). To mention but a few rarities, the St. Louis Zoological Park exhibits an Echidna, the Great Grey Kangaroo, five Black Lemurs, three Red Uakaris, a Hairy Sakik, a pair of Phayre's Leaf Monkeys, a pair of Siamanqs, seven Orang Utans, two pairs of Gorilla, a pair of Spectacled Bears, three Kodiak Bears, a pair of Kamchatka Bears, a pair of Brazilian Otters, a Clouded Leopard, a Cheetah, a Northern Elephant Seal, two South American Manatees, a pair of Grevy's Zebras, a pair of Malayan Tapirs, a pair of White Rhinos, four Black Rhinos, three Pygmy Hippos, a male Okapi, a female Gaur, a pair of Sable Antelope, two pairs of Beisa Oryx, three Blesboks, three White-tailed Gnus, breeding Klipspringers, a Cuban Parrot, two Rothschild's Mynahs, two White-necked Picathartes and more representatives of the strange, South American bird family, Cotingidae, than any other Zoo.

Artur Heye, 1933



A Dog In a Lion's Cage

"Peaceful coexistence" responded my Russian host. This was his answer to my anxious enquiry concerning the fate of a small dog in the lion's cage at Moscow Zoo. It was one of the many surprising things I saw in my visit to the Soviet Union.

My host explained that in many Soviet Zoos small dogs are placed in the cages as companions for lions. A strong attachment develops between the two animals. Furthermore in the previous year a lion died apparently of a broken heart when no replacement was found for its canine companion which had died a month previously.

Certainly there was no antagonism; the dog chewing at one end of a large bone that the lion was gnawing at the other.

My scientific training exerted itself and I resolved to delve into this friendship of dogs and lions. I knew that Zoos often house different kinds of animals in the same cage, but to house such a combination as a dog and a lion was most unusual.

A colleague, Dr. H. Lees, provided me with my first and probably the earliest written description of the phenomenon from no greater authority than "The Adventures of Marco Polo," Book II:

"It is an admirable sight, when the lion is let loose in pursuit of the animal, to observe the savage eagerness and speed with which he overtakes it. His majesty (Kublai Khan circa 1280) has them conveyed for this purpose, in cages placed upon cars, and along with them is confined a little dog, with which they become familiarized."

The Soviet custom is thus an eastern one. Probably it was not a "lion" that Marco Polo saw for he described it later in the same paragraph as a striped animal. "Tiger" appears rarely in European writings before the 15th and 16th centuries.

The custom is also known in western Europe and Hediger in his book "Wild Animals in Captivity" referred to the caging of lion and dog together and the mistake that the public, and certainly myself, make in believing the dog is the lion's food. Konrad Lorenz also mentioned it in 1935.

Obviously the phenomenon is well known in Zoological circles. How can this strange relationship be explained? My researches revealed no satisfactory explanation, most falling into two general categories.

The first explanation suggests that the dog and lion become companions. The report by my Russian host of the lion's death supports this idea of companionship. It could also be that the lion was introduced as a cub to the dog and accepted it as a foster-mother. Many young animals will accept substitute mothers. In my observations this was probably not the case as the lions were full grown when the dog was introduced.

The second explanation accepts the predator-prey relationship of these animals and suggests that the predator through some quirk simply spares the prey. Other examples are cited: vipers in

a cage will spare a mouse and the mouse will live in the cage with the vipers for a long time. If a new viper is introduced, then the mouse is often killed by the new viper. A modification of this explanation suggests that the lion is not an aggressive animal, and as long as it is well fed it would not harm the dog.

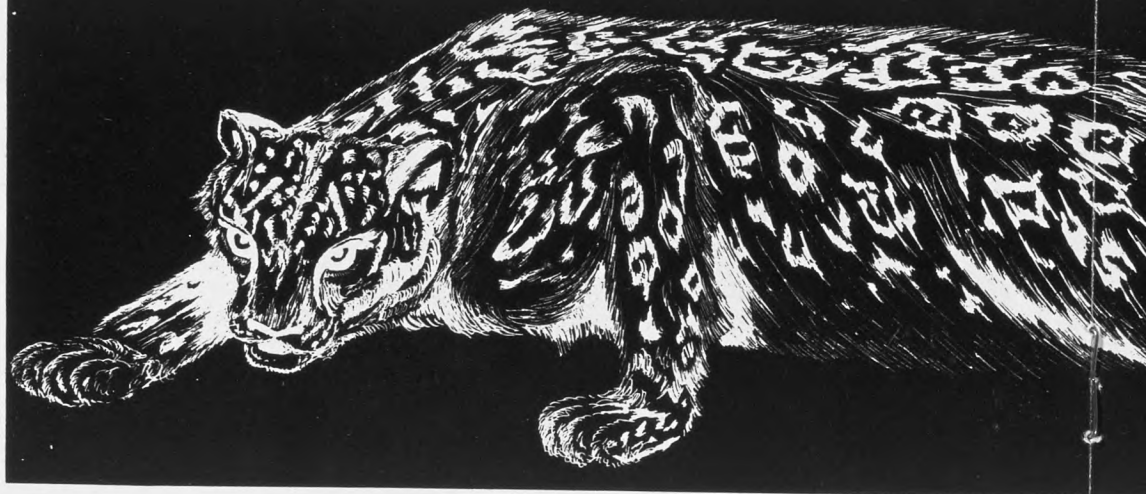
These observations increased my interest in the reactions of animals to one another under unnatural conditions. Among animals of the same species the difficulties of confinement are overcome, as in many domestic animals by the development of "peck order" or the dominance of one animal over another and one sex over another. This is true among the Pere David's deer, the pronghorns, and the reindeer in our own zoo.

With animals of different species biological replaces social ordering. In the barnyard the hen gives way to the duck, and the duck to the goose. This feature is used to house together many kinds of birds. At our zoo there are many examples of species of hoofed animals together in the same enclosure. Wisent and red deer are in one enclosure and here as far as I can determine, keeping one's distance is the key to getting along. In another cage compatibility was shattered earlier this year, our Director, Dr. Voss informs me, when the llamas started to handle the young pronghorns too roughly. The balance is therefore delicate and may be quickly disturbed both by unknown factors and by such known actions as the introduction of a new animal. The general ability of hoofed animals to tolerate other species is, perhaps, not so unusual for the common picture of the African plains is the mixture of zebras, gazelles, and wildebeest.

Another group of animals which can be caged together are those that seek "contact comfort." One has only to watch the prairie dogs to see how two or three will curl up together during rest. In other zoos I have seen various kinds of rodents, caged and sleeping together.

Still the dog and lion relationship remains unexplained, and provides a reason for looking carefully at all the animals in the enclosure and for speculating on how they exist together. Maybe the animals in the zoo do have something to teach us about "peaceful coexistence."

—Harold E. Welch,
Department of Zoology,
University of Manitoba.



Our Zoo Animal Collection (4)

This series of contributions began with a review of animal acquisitions which were recommended by our Zoological Society's research and liaison committee eight years ago. Let us look at the events of the first six months of 1967 in the light of our Committee's suggestions.

A unit of new enclosures, the Tragopan cages, became ready for occupation. However, the occupants are not the beautiful, hardy Tragopans, simply because I have been unable to obtain any as yet.

Moving on to more pleasant news, our Assiniboine Park Zoo has acquired some fascinating kinds of birds and mammals during the first half of 1967. The most outstanding acquisition is a pair of Snow Leopards; the female was caught in the mountains of Central Asia and acquired in trade for a pair of young Pere David's Deer and some small stock; the male, hand-reared at the Bronx Zoological Park in New York, was traded in for a young Siberian Tiger of ours. The Snow Leopard is a species long ago recommended for acquisition. Members of the Research and Liaison Committee and, indeed, every friend of our Zoo, will be delighted that this fine and valuable species has finally been obtained.

New on public exhibit are the Chinese Leopards of ours. They are a pair. An-

other female of the same race is expected.

Our Zoo received a group of young European Genets, two each from Amsterdam and from Quebec. Canadian Wolf pups and young Beavers are further noteworthy arrivals, but we are bound to swap them with other Zoological Gardens where there are suitable accommodations.

The T. Eaton Co. gave us a Palm Civet and a Lesser Pied Hornbill, this one shown in a tragopan cage for the duration of our summer, or until Tragopans arrive. Then the exotic ones will be sent to other Zoos. Newly acquired birds include the rare Cape Barren Geese, the beautiful pair of Scintillating Copper Pheasants and the nice White-crested Kalij Pheasants, already reproducing.

Collared Peccaries are expected to arrive and so are bears to fill our re-built moats. Our goal is to exhibit the North Korean Black Bear, the Canadian Barren Grounds Grizzly and the always popular Polar Bear, but we will have to settle for interim solutions until the rarer kinds can be had. The Manitoba Wildlife Branch has generously provided Black Bear cubs to help our Zoo in this respect.

Animal acquisitions are largely a reflection on the Zoo Director's trading skill. If we want to have proof of proper



Snow Leopard, after an original drawing for Zoolog by Graeme MacKendrick, September 1967

animal care, the available yardsticks are health, condition, longevity and, most important, breeding success. It is with regard to animal reproduction that this report is bubbling with pride. In the first six months of 1967, our Zoo has been raising a male Saiga Antelope, a Mara or Patagonian Cavy and twin Binturongs, all of these for the first time in Canada; for the first time in our Zoo's history, Mottled Ducks, Kalij Pheasants, Prairie Dogs, Alpaca and Pronghorn twins were raised, and Red Deer are pregnant. Our young Siberian Tigers are growing rapidly, and our three young Pere David's Deer are doing very well. I cannot mention all the standard youngsters to which belong baby Lynx, Monkeys, Wallabies and Wallaroos, Guanaco, Llama, Mouflon and many Deer fawns.

In regard to animal breeding, our Assiniboine Park Zoo compares favorably with good and excellent institutions elsewhere. Animal health and reproduction rates are first class. For this, I want to express my gratitude to the devoted, interested animal keepers, singling out the Zoo Supervisor, our diligent, hardworking Rudy Wulf; our senior commissary man, John Malinauskas; our senior keeper, Rolf Henning. I want to thank our superb veterinarian, Dr. Ross Major, our ever-helpful Dr. Norman Stanger (who relent-

lessly assists us in combatting parasites) and our president and the officers of our Zoological Society of Manitoba, whose advice is so immeasurably helpful.

* * *

Scientific names of animals mentioned:

Snow Leopard = *Panthera uncia*;

Pere David's Deer =

Elaphurus davidianus;

Siberian Tiger =

Panthera tigris longipilis;

Chinese Leopard =

Panthera pardus japonensis;

European Genet =

Genetta genetta rhodanica;

Palm Civet =

Paradoxurus hermaphroditus;

Cape Barren Goose =

Cereopsis novaehollandiae;

Scintillating Copper Pheasant =

Symaticus soemmeringi scintillans;

White-crested Kalij Pheasant =

Lophura leucomelana hamiltoni;

North Korean Black Bear =

Selenarctos thibetanus ussuricus;

Saiga = *Saiga tatarica*;

Mara = *Dolichotis patagonum*;

Binturong = *Arctitis binturong*;

Mottled Duck =

Anas platyrhynchos fulvigula;

Pronghorn = *Antilocapra americana*.

—Gunter Voss, Dr. rer. nat., Zoo Director

FOR THE UMPTEENTH TIME
THE TELEVISION ANNOUNCER
EXHORTED ME TO BUY
MYSELF A COLOR SET AND
ENJOY THE LIVING WORLD
OF COLOR. I HAVEN'T
FOLLOWED HIS ADVICE BUT
THE EMPHASIS OF THE LAST
FEW YEARS ON COLOR IN
TELEVISION AND MOVIES HAS
AROUSSED MY CURIOSITY
ABOUT COLOR VISION IN MAN
AND ANIMALS.

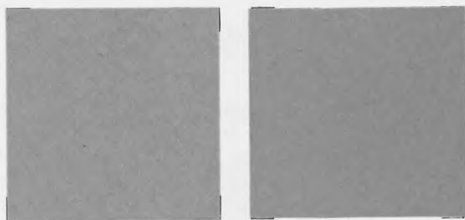
An Incomplete Look into Color Vision

Dr. W. V. Buddenbrock, in his book, "Color Sense of Animals," describes the vision of humans as one of duplicity, meaning that we can see in color and black and white. Our eye is built somewhat like a camera, the pupil forming the lens, and retina the film. The duplicity of vision comes from the fact that color receptive cells on the retina, "cones," are more or less in one bundle, and black and white sensitive cells, "rods," so called because of their shape, are spread over the rest of the retina. Ordinarily, we focus on the bundle of "cones" and therefore see in color. When light gets too dim to produce a satis-

factory color image, our eye switches to the black and white vision of the "rods." Initial discovery of this was a result of the "Purkinj Phenomenon," the outcome of a rather neat little experiment.

Take a piece of blue paper, put it beside a green piece that is a bit lighter and again put this beside a pink piece, lighter still, and then add a piece of yellow. You will now have an arrangement of different colors that get lighter from left to right, roughly. Now you spend half an hour in a dark room to get your eyes used to working in the dark. Then you let just enough light into the room that your eyes can find the place where the colored pieces are, and lo, you will see that the light pink and yellow are now the darkest and the other pieces may not be visible at all. Your eyes have switched from color to black and white vision.

As the most important part of vision depends on the brain, and as the workings of brains differ greatly, a much debated question is whether any given color, or light of a given wavelength which is the same thing, appears the same to me as it does to you.



What we don't know about our own color vision is nothing compared to the darkness that we find when we look into the color vision of animals. Even vertebrates, which at least have an eye structure the same as we, seem to throw scientists into a tither. Greatly divergent views abound on the presence of "cones" in the eye of the Guinea Pig, an experimental animal if there ever was one. According to researchers Schulze and Krause, the Guinea Pig does have cones. On the other hand, Mr. Menner maintains that they don't have any and Mr. O'Day is of the opinion that the Guinea Pig possesses an extraordinary number of cones compared to other mammals. Various physiologists have consequently made experiments with the Guinea Pig and whereas one comes to the conclusion that the Guinea Pig sees red and yellow quite well, but becomes perplexed by green and blue shades, another one says the opposite is true.

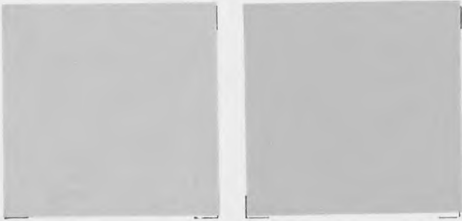
However, not all animals are as difficult to deal with as the Guinea Pig. Anatomical and physiological research

can reach definite conclusions with a number of animals, however few, that have been studied.

Is there any possibility of drawing conclusions from an animal's mode of life on its ability to see color? Indeed there is. However, one must be extremely careful with this, and even then, the experiment may prove you quite wrong.

Many mammals prefer to forage or hunt at night and one could quite reasonably assume that color vision is of no great advantage for them, ergo they don't have any; conversely, animals that crawl, fly, or walk about during daytime allow us to surmise that they have at least some color vision. However, both trains of thought can lead us astray.

Racoons and cats, both nocturnal creatures, seem to have some sense of color shown by experiments. Some daylight hoofed animals such as cows, show no particularly well developed sense of color. With many mammals, the eye is not particularly important. Other senses, such as smell, hearing, and touch, take over and therefore vision is not as good as it could be



Birds, reptiles, amphibians and fish help a little more because most of them enhance their mating behavior with a distinct, sometimes brilliant, coloration. However, this coloration itself is sometimes misleading. A castrated mallard drake will keep his colorful plumage. A spayed mallard hen will, at the next moult, adopt the drake's colorful plumage. This shows simply that the male breeding plumage doesn't depend on male hormone; instead, the hen's drabness depends on the presence of female hormone. This neither proves nor disproves any theories of color vision because in courtship the color is used and its cause is in that instance of no importance, at least Dr. Buddenbrock says so when he cites the example of the mallard to show some of the possible pitfalls of research into color vision. Animals with bright colors ought to be a little more receptive to colors than those with drab bodies. On the whole this is right, although we must always beware of jumping to conclusions and wait for the outcome of experimentation. Even then, we may only say that

this or that particular animal has shown evidence of recognizing colors, as even within a group of dogs of the same litter, one apparently can identify colors, and another one can't. Could this be the fault of the experiment, or does color perception indeed differ with each individual?

To prove color vision with experiment is not the easiest thing in the world. The animal must be trained to respond to a certain color, and it must also be ascertained that it can tell this color apart from similar grey shades. The grey shade, or black and white value, is determined by the frequency of light waves. Color tests with frogs posed quite a problem until a Czech researcher, Mr. Babak, used the frog's breathing as an indicator. He went from the theory that breathing reacts most delicately to any change in mood and feeling. The throat breathing in a frog can easily be observed and it was subsequently discovered for instance, that red slows down breathing in most frogs.

So far, I have been giving a small sampling of what is in store for anyone intent on pondering color vision in humans and animals with an eye that has a lens and a retina. As you can see, things became non-conclusive, in fact, confusing. I shall spare the reader the agony of going through the rising hopes and inevitably following disappointments when one investigates literature on animals with a composite eye, such as illuminates the life of insects and other animals with eyes entirely different from the eyes of vertebrates. The subject is fascinating, the study of it is like falling in love, which when unrequited is still exquisite.

Eventually, perhaps, we may learn more about color vision, indeed, more about animals. Of course, as long as a zoo is considered primarily as an entertainment centre for children to throw peanuts to the bears, one cannot expect research to be done there. But where else can it be done? No other institution has such a variety of animals. The animals in a good zoo already have accommodation suitable for them and they are therefore in a reasonably happy state of mind which is necessary for successful experiments. Most important, the people working in a zoo know something about the animals already and can avoid many costly errors.

More and more people realize this, and among others, the Zoological Society of Portland, Oregon, has built a research centre at the Portland Zoo where many scientists are given the opportunity to use the zoo's unique inventory for their studies.

The Color and Function of Leaves

Green is the color of life. After the long drab darkness of winter, what is more wonderful than the first glimpses of green as the leaves on our trees and shrubs unfold and brighten up our spring landscape.

However, how many of us fully realize how vital a function these leaves really perform. So let's take a leaf — any leaf, and look at it closely. You will see that the two sides are unlike. The upper side is often glossy and waxy and darker than the underside, which sometimes even has a protective coat of down. Each side of the leaf is different because they perform two separate functions: respiration on the lower surface, work with the sun on the upper.

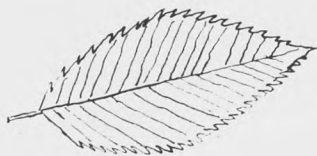
Plants must take in oxygen and a small amount of carbon from the air to live and grow. They do this through their leaves which breathe through their pores on their sheltered underside — so many and minute that they average about 100 to an area the size of an ordinary pin-head. These pores are usually slit-shaped like the pupils of a cat's eyes — and just as cat's eyes expand in darkness or contract in bright light, so leaf pores respond to atmospheric changes. On hot days, lest the leaf wilt by water loss through evaporation, its pores may almost close, opening up and closing in response to the heat of the sun. The pores of a leaf also help to bring water up from the roots of the plant. Evaporation at the pores causes a partial vacuum within the cells, and this suctionlike effect is communicated from cell to cell back through the leafstalks, down the main stem and down into the ground. Boosted by root pressure from below thread-fine columns of water are thus sucked up, like soda through a straw. All this goes on dead against gravity right up to the top of the tallest tree.

Meanwhile on the upper side of the leaf, the side exposed to the sunlight, other wondrous things are going on. The leaf is using solar energy to power the greatest industrial plant on earth. This foliage factory uses for machinery the green coloring matter in the leaf, called chlorophyll. The energy of the sun activates the chlorophyll. With this energy the chlorophyll smashes open the molecules of the water (H_2O), and the oxygen and carbon which the leaf has taken in through its pores from the air and reassembles these atoms of oxygen, carbon and hydrogen into new compounds constituting sugars and starches, the basic foods required for growth, through a process which we call photosynthesis.

Chlorophyll has been called the green blood of the world! It is carried in the leaf in minute green discs, which, like the corpuscles in our blood, can move about almost as if they led a life of their own. When the sunshine is too strong, they can turn edge on, or sink or go to the sides of the cells. When the sunshine diminishes they can turn broadside and rise to the top of the leaf to make the most of the light.

Further, leaves help to provide us with oxygen. For when the leaf by photosynthesis breaks up the water and carbon dioxide (CO_2) into their elements, there is a lot of oxygen left over, that it breathes out through its pores in such quantities that all our air is wonderfully refreshed. Thus you could say that we live under a sort of an oxygen tent together with an air conditioning unit, for the air around leaves is faintly cooled by the evaporation of water from the leaf pores.

Now as summer blends into autumn, we see our bower of green leaves put on new colors. They are not really new as they are actually the natural pigments



of certain foods produced by the leaves, which are merely masked by chlorophyll, in the summer.

At this season of the year chlorophyll ceases to be manufactured in the leaf and what is there dissipates — the leaf factory is closing down for the year. The visual results are that the two yellow pigments, carotin and xanthophyll, contained in the leaf show through and turn our leaves yellow. However many plants differ in time and degree in the breakdown of chlorophyll in the leaf. This naturally causes the leaves of various plants to color up, some earlier, some later. Also where the breakdown of chlorophyll in the leaf is neither soon enough or complete enough, the results are that leaves turn from green to brown or only show a tinge of yellow.

Now you may ask: "But where do we get our red and scarlet coloring in our leaves?" The answer is a third pigment in the leaf called anthocyanin the quantity of which is regulated by the amount of sugars and tannins accumulated in the leaf. Again you may ask: "Why are some autumns more colorful than others?" The reason is simply, the weather. Warm bright sunny days in the fall allow the leaves to manufacture sugar. When these days are followed by cool nights of below 45°F the sugar in the leaves is "trapped." There is little or no translocation of sugars and other materials from the leaf to other parts of the plant. The accumulation of these products results in the manufacture of the red anthocyanin pigment that gives us our reds and, in combination with our yellow pigments, our golds. On the other hand, dull weather, even shade, reduces the amount of sugar and tannins produced in the leaves and consequently the amount of the red anthocyanin available to give the leaves their most brilliant

colorings. Finally, it is recognized that there often is considerable range of intensity of coloring within a species. However, each is credited with a distinctive general effect. Some examples of woody plants esteemed for the dress glory they take on locally are:

FLAMING RED: Native woods, — Smooth, Sumac; Riverside Creeper which is the native form of what is known as Virginia Creeper; Red Maple in acid soil; Nannyberry; Saskatoon; Blueberry; Sand Cherry; Pincherry. Imported ornamentals, — Winged Euonymus; Amur Maple; Shining Rose (*Rosa nitida*, the wild rose of Newfoundland); Japanese Barberry; Mongolian Oak.

DULL REDS and PURPLES: Native woods, — Redosier Dogwood; Chokecherry; Blackberry; Shubert Chokecherry; Mountain ash; American Cranberrybush; Downy Arrowwood. Imported, — European Mountain ash; Kesselring Dogwood; Tatarian Dogwood; Smoketree (a Sumac); Cistena Cherry; Sutherland and several other of the Rosybloom Crabapple varieties.

YELLOW and GOLDEN: Native woods, — Trembling Aspen; Paper Birch; Green Ash; Bittersweet; Cottonwood; Hackberry; Black Walnut; Basswood; Buckeye; Silver Maple; Larch; Elm (inclined to be a bit dull).

BRONZY, ORANGE-REDS, and RED-ORANGES: Native woods, — Hawthorns; Sugar Maple; Wild Plum; Mountain Maple; Hazels; Wild Roses; Ironwood; Showy Mountain ash; Buckeye or American Horse chestnut.

NO CHANGE IN AUTUMN: Buffalo-berry; Lilacs (common) but the Early Lilac becomes velvety purple; many Willows; Potentilla; many Clematis; Russian-olive; Silverberry; some Honeysuckles; Boxelder, "Manitoba Maple" in local parlance; many Apple trees; Bur Oak.

—G. S. Reycraft, B.A., F.R.H.S.

Aquarium Show In Winnipeg



The Winnipeg Aquarium Society "Xiphophorus" held its first show at the Red River Ex 1967. It was the biggest undertaking of this kind ever staged by hobbyists of tropical fish in Winnipeg. We hope that as one result more and more Manitobans and Winnipeggers realize that there is a group in town devoted to this special hobby. The society dates back to the thirties, but only since late in the forties has there been any activity to speak of. Our goal is to help the tropical fish hobbyist with his problems and to foster the hobby. We are also interested and willing to help Winnipeg become the home of a public aquarium. We hope that we have made a fair impression on the general public and hobbyists through this show.

To belong to a group that has many of its members working together is most enjoyable. Often they are the same again and again but the group is growing and so are the results. It is surprising what the individual can do and what a group effort is able to achieve.

Our thanks go to a large number of

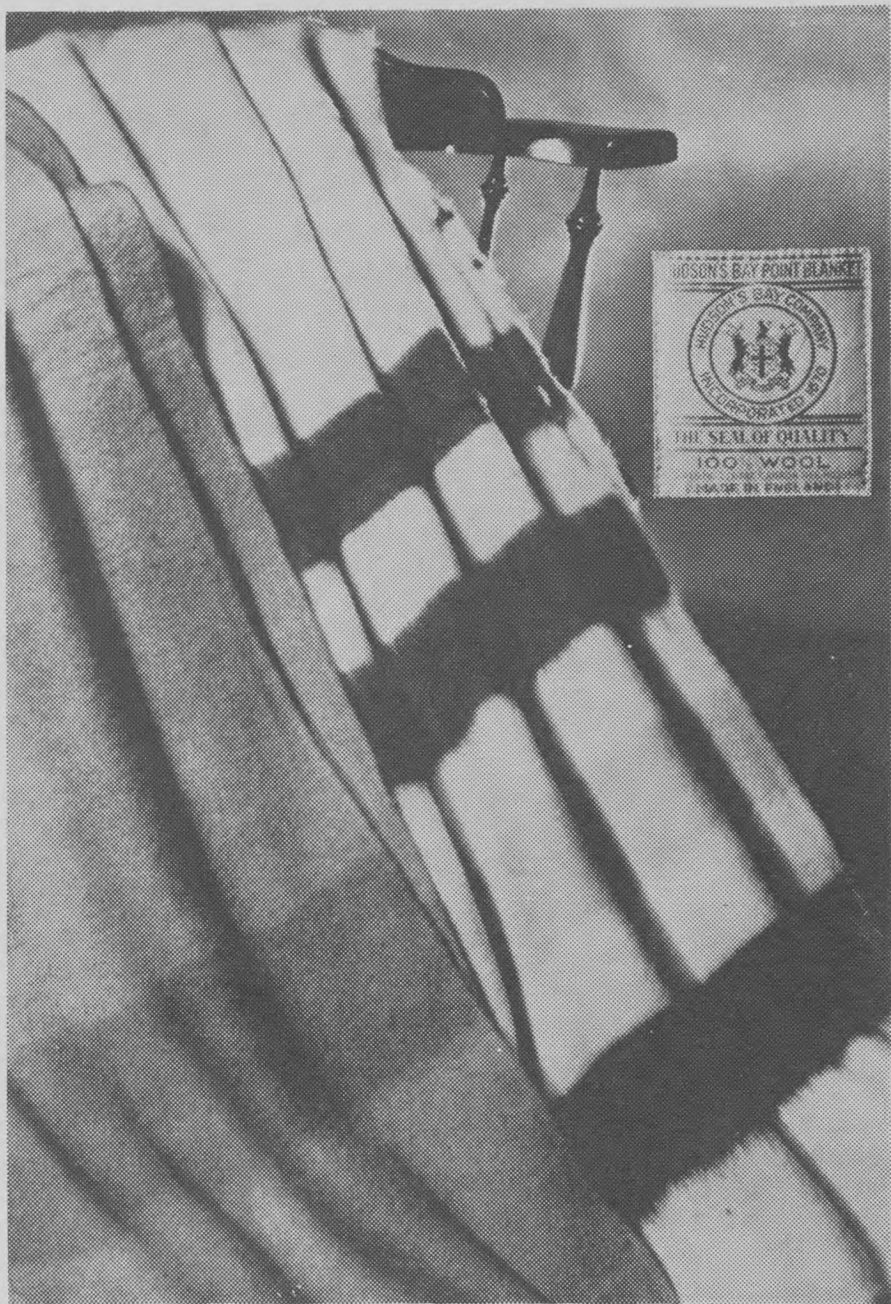
people for their help which we acknowledged at the appropriate place during the show. Also we are very happy that the Red River Ex. Assoc. has given us the space for the display. Special thanks are extended to the judges, who had to pick the three best tanks out of 21. It was not easy to handle and was done with great care. The judges were Dr. Annita G. Voss, Dr. R. W. Nero and Mr. W. B. Tadman.

Their final decisions were: 1st: Fish, Len Schellenberg; plants and set-up, John Serger. 2nd: in all, Mrs. Erika Dorn. 3rd: in all, Andy Vangerwen.

The tanks were only set up for 24 to 48 hours before judging and so it happened that some did improve during the week and became better than the winners.

If you are interested in fish and other animals, or if you are a hobbyist, fisherman or just love animals, why not join the Zoological Society of Manitoba or the Winnipeg Aquarium Society? Give us your support and contact the Editor.

—John Serger



The Seal Of Quality . . . Hudson's Bay

Point Blankets — a standard for the world! Made in England to precise Hudson's Bay standards for almost 3 centuries! You'll enjoy the warmth and beauty they provide, 100% pure wool richly hued in colors as scarlet, green, sky blue, gold and others. For a lifetime of warmth and beauty invest in . . . The Seal of Quality, Hudson's Bay Point Blankets.

the  ay

ASSINIBOINE PARK ZOO

OPERATED BY

THE METROPOLITAN CORPORATION OF GREATER WINNIPEG

PARKS AND PROTECTION DIVISION

ANDREW CURRIE, DIVISION DIRECTOR

DR. GUNTER VOSS, ZOO DIRECTOR

Honour Roll

THESE MAJOR CONTRIBUTIONS OF THE LAST FIVE YEARS
ARE GRATEFULLY ACKNOWLEDGED

Manitoba Wildlife Branch

Animal Donations, Native Animals,
1963, 1964, 1965, 1966, 1967

Zoological Society of Manitoba

Moated Pens and Shelter, for Carnivores,
1963

Royal Trust Company

Animal Donation, Pandas, 1963

Carling Breweries Manitoba Ltd.

Animal Donation, Lions, 1964

Bearing Supply & Service Ltd.

Animal Donation, Gibbons, 1964

The Airliner Motor Hotel

Animal Donation, Ducks, 1964

Trans Air Limited

Animal Donation, Birds, 1964

Federal Electric Corp. and Govt. of Can.

Animal Donation, Polar Bear, 1965

Zurich Zoo, Switzerland

Animal Donation, Raccoonlike Dogs,
1965

Mr. O. A. Olson, Nigeria

Animal Donation, Grey Parrot, 1966

Anonymous Donor

Accommodation, for Wolverines, 1966

Odeon-Morton Theatres

Animal Donation, Lion cub, 1966

Mrs. Peter Curry, Winnipeg

Animal Donation, Hartmann's Mountain
Zebras, 1966

Wiley Ford Mercury Sales

Animal and Cage Donation, Cougars,
1966

Eaton's of Canada

Animal Donation, Birds, 1966

Dr. Robert E. Warriner

Animal Donation, Deer and Monkeys,
1966

Department of Indian Affairs and Northern Development, Churchill

Animal Donation, Caribou, 1967

Many of the above gifts were channelled through the Zoological
Society of Manitoba. Donations are accepted by our Zoological
Society and thus become tax-deductible.